

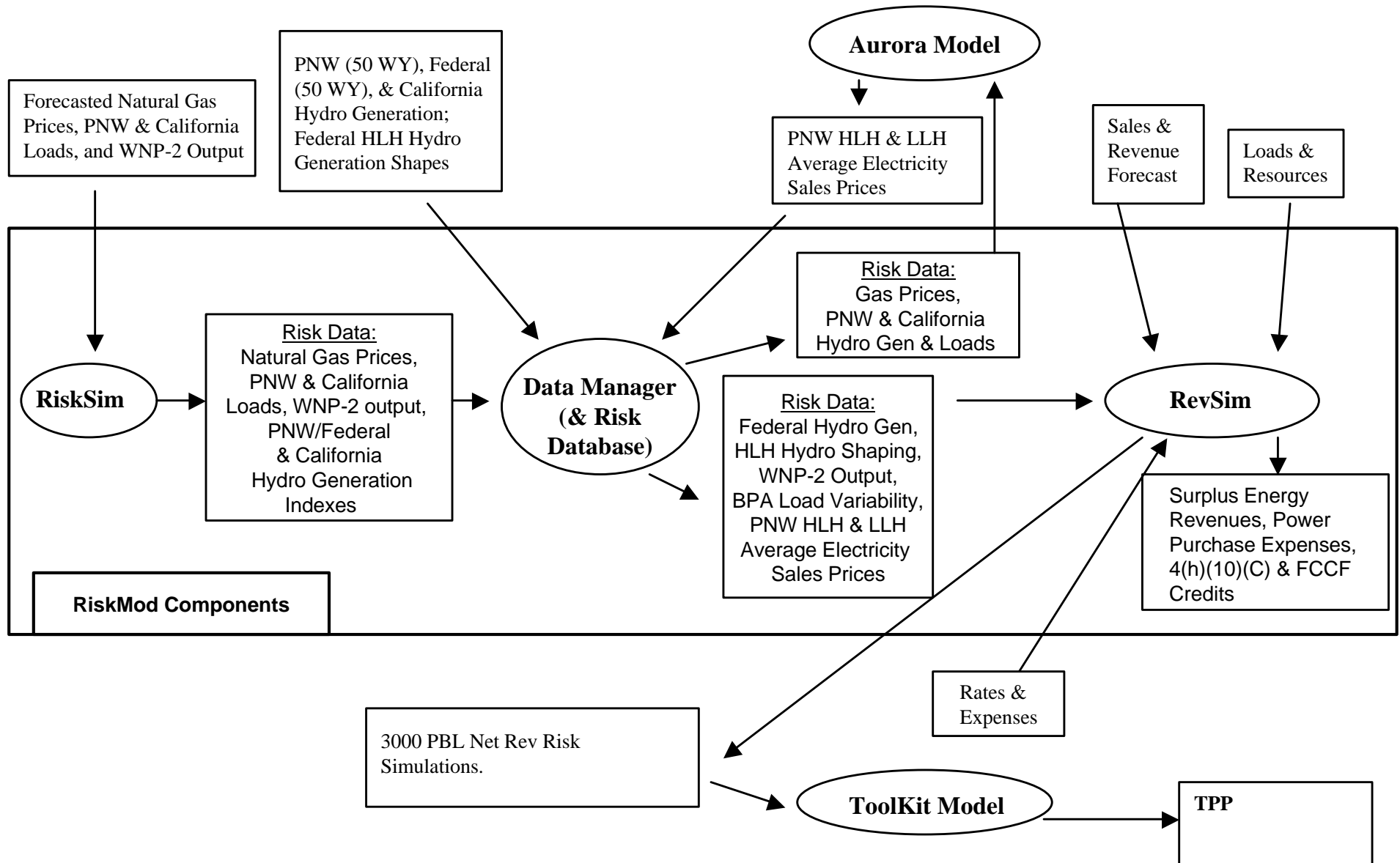
# FY 04 – 06 Surplus Revenue Forecast

# Methodology for the FY 04 – 06 Revenue Forecast

- Slight methodology change from May 2000 rate case
  - In the May 2000 rate case, the prices for the surplus revenue forecast were derived from varying only the hydro conditions.
  - Alterations to those prices were made in the spring months when large quantities of surplus existed.
- Our current methodology includes altering not only hydro conditions, but also gas prices and loads. 3,000 “games” are run with prices forecasted for each of the 3,000 games. Those prices are then mapped back to our surplus energy amounts to derive our surplus energy revenue forecast.
- Currently, BPA is forecasting prices for surplus revenues to reflect the fact that the PNW market is a bilateral market. AURORA forecasts hourly marginal prices. In the PNW, there is not an hourly market clearing mechanism. Instead, sales are conducted on a bilateral bases. It is BPA’s opinion that the bilateral market does not reflect the highest hourly marginal price.
- As a proxy to reflect the fact the PNW is a bilateral market, BPA reduced the amount of load in the PNW by 2,500 aMWs. 2,500 aMW the approximate of average surplus that comes off the Hydro system under average water conditions. The 2500 aMW amount is also close to the amount of surplus energy BPA is forecasting to sell. This is not the first time BPA has used this proxy. In the May 2000 rate case, BPA used a similar proxy to derive the \$28.10 market price forecast.

# RiskMod Risk Analysis Information Flow – SN CRAC Study

(Revised From Graph 1, “Risk Analysis Study”, WP-02-FS-BPA-03, Page 6)



# Oregon, Washington and Northern Idaho Load Forecast

|       | Jan    | Feb    | Mar    | Apr    | May    | Jun    | Jul    | Aug    | Sep    | Oct    | Nov    | Dec    | Ave    | Growth |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| CY 03 | 20,453 | 19,919 | 18,141 | 16,896 | 16,362 | 16,362 | 16,540 | 16,362 | 16,007 | 16,718 | 19,030 | 20,453 | 17,760 |        |
| CY 04 | 20,801 | 20,258 | 18,449 | 17,183 | 16,641 | 16,641 | 16,821 | 16,641 | 16,279 | 17,002 | 19,354 | 20,801 | 18,068 | 1.7%   |
| CY 05 | 21,217 | 20,663 | 18,818 | 17,527 | 16,973 | 16,973 | 17,158 | 16,973 | 16,604 | 17,342 | 19,741 | 21,217 | 18,424 | 2.0%   |
| CY 06 | 21,599 | 21,035 | 19,157 | 17,842 | 17,279 | 17,279 | 17,467 | 17,279 | 16,903 | 17,655 | 20,096 | 21,599 | 18,755 | 1.8%   |

# NATURAL GAS

## Price Forecast Summary Outline

 **Price Forecasting Methodology**

 **Geographic Background**

 **Forecast Assumptions**

 **Henry Hub Prices**

 **Regional Price Differentials**

## NATURAL GAS

### Price Forecasting Methodology

#### ✍ Forecast Henry Hub

- Short-term Forecast draws on NYMEX

#### ✍ Forecast Regional Price Differentials (Basis)

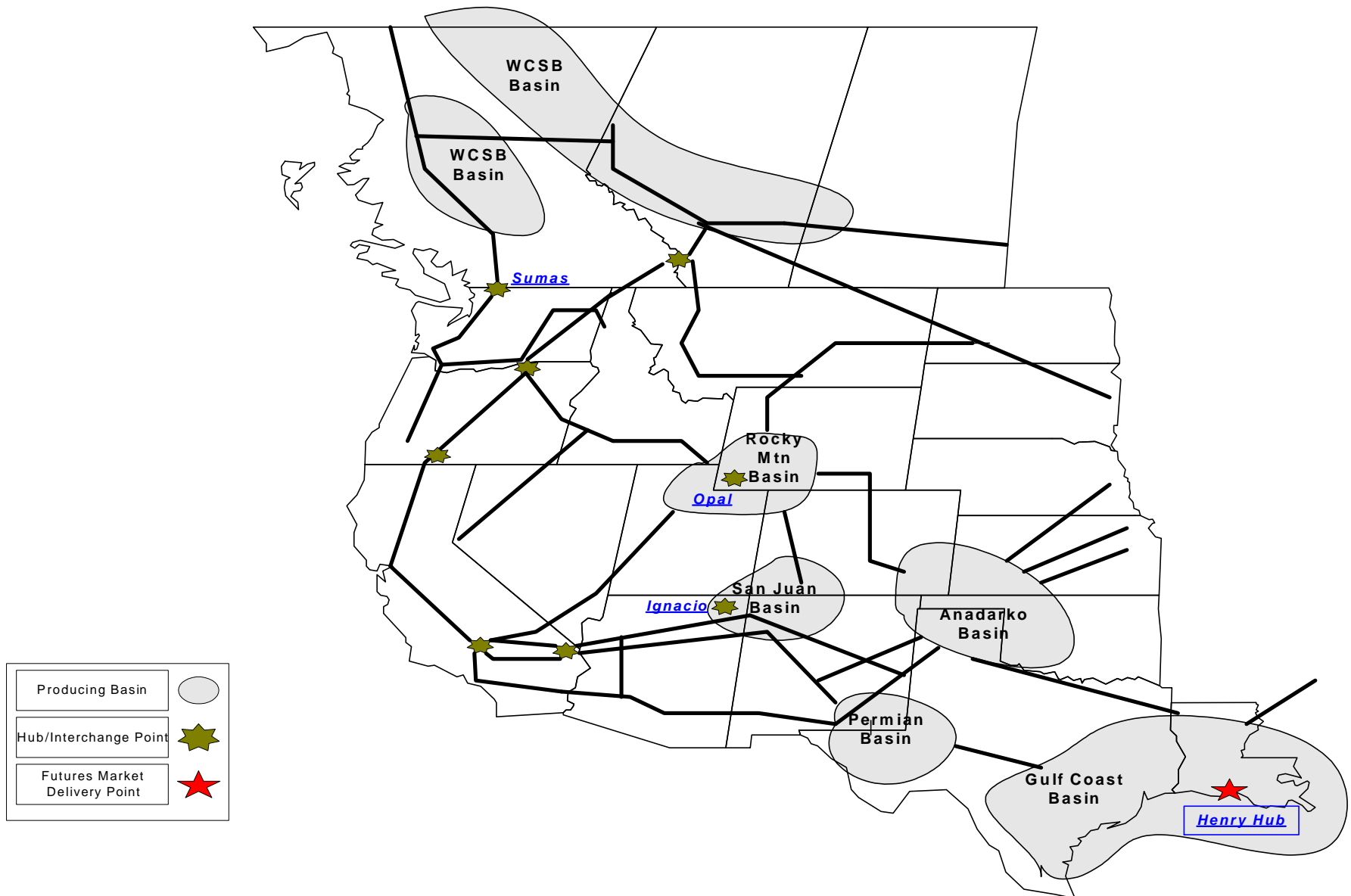
- Sumas – Western Canada
- Ignacio – San Juan Basin
- Opal – Rocky Mountains
- Basis depends on transportation costs, pipeline construction

#### ✍ Add Delivery Costs from Regional Hubs for Power Generation Price

- Delivery cost adders drawn from NPPC Draft 5<sup>th</sup> Power Plan

# NATURAL GAS

## Geographic Background



## **NATURAL GAS**

### **Forecast Assumptions**

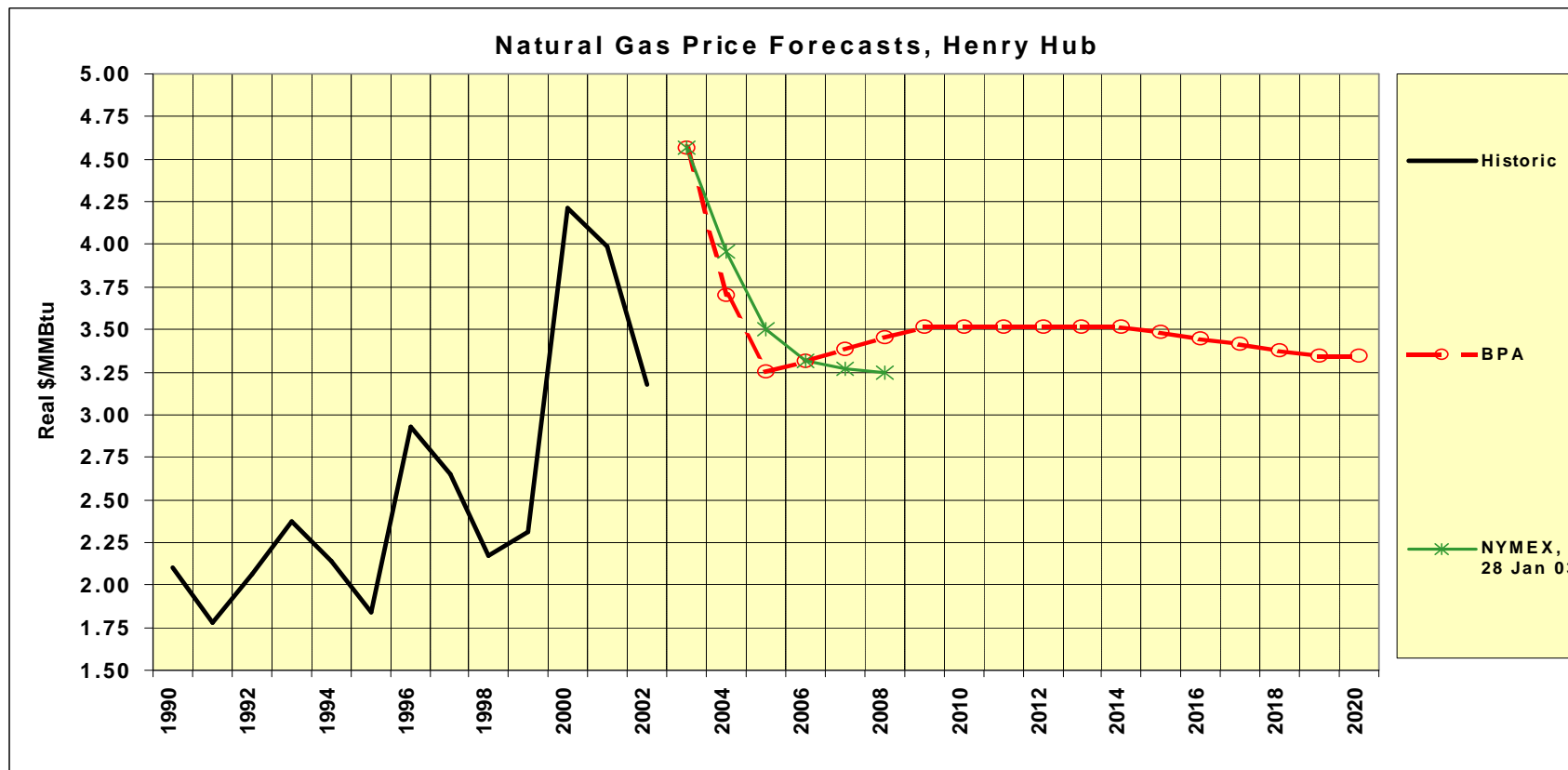
#### **Short term Price Outlook**

- ✍ Heavy storage withdrawals and resilient demand lead to a price spike of around \$5.00 (Henry Hub, nominal\$) in 2003
- ✍ A response to high prices from both suppliers and consumers leads to moderate price declines from 2003 to 2006
- ✍ Prices will remain high relative to historic levels
  - Existing supply basins are mature and seeing a decline in productivity
  - Demand from power generation will remain strong; natural gas will remain the dominant fuel source for new generation and power demand is relatively inelastic

#### **Mid-Term / Long-Term Price Outlook**

- ✍ In the mid-term, 2006-2010, the mature supply basins will be strained to keep pace with demand
- ✍ Upward pressure on price will exist until new supply is brought on-stream
- ✍ By 2010, supply response from new sources (LNG, coalbed methane, deepwater production) will mitigate price increase. Prices are forecast to remain relatively stable at about \$3.50 (real 2000\$)
- ✍ After 2015, additional new supply sources (MacKenzie Delta and Alaska) will exert downward pressure on real prices

# NATURAL GAS Henry Hub Prices



| Henry Hub Natural Gas Prices |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                              | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2015 | 2020 |      |      |      |      |      |      |      |      |      |
| Nominal \$                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Historic Forecast            | 1.70 | 1.49 | 1.77 | 2.09 | 1.92 | 1.69 | 2.74 | 2.53 | 2.09 | 2.27 | 4.21 | 4.08 | 3.33 |      |      |      |      |      |      |      |      |      | 4.91 | 4.08 | 3.67 | 3.84 | 4.02 | 4.20 | 4.39 | 4.50 | 5.04 | 5.48 |
| Real \$                      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Historic Forecast            | 2.10 | 1.78 | 2.06 | 2.38 | 2.14 | 1.84 | 2.93 | 2.65 | 2.17 | 2.31 | 4.21 | 3.99 | 3.17 |      |      |      |      |      |      |      |      |      | 4.57 | 3.71 | 3.25 | 3.32 | 3.38 | 3.45 | 3.52 | 3.52 | 3.48 | 3.35 |

Real prices are 2000\$

## NATURAL GAS

### Regional Price Differentials

✍ Basis from Henry Hub (Real 2000\$)

- Sumas = \$0.50
- Opal = \$0.45; \$1.35 in 2003 before Kern pipeline expansion
- Ignacio = \$0.30; \$0.55 in 2003

✍ Delivery costs from regional hubs to AURORA areas vary from about \$0.20 to \$0.50

- These costs are drawn from the Northwest Power Planning Council Draft 5<sup>th</sup> Power Plan

# Comparison of May 2000, June 2001 Rate Case Forecasts and Current Forecast (Revised)

## May 2000 Rate Case

|        |    | <b>Surplus<br/>Energy<br/>Revenues</b> | <b>Surplus<br/>Energy<br/>Sales (aMW)</b> | <b>Avg. Annual<br/>BPA Weighted<br/>Surplus Prices</b> |    | <b>Power<br/>Purchase<br/>Expenses</b> | <b>Power<br/>Purchases<br/>(aMW)</b> | <b>Net<br/>Revenues</b> | <b>Net<br/>Energy</b> | <b>Net<br/>Price</b> |
|--------|----|--|---|--|----|--|--------------------------------------|-------------------------|-----------------------|----------------------|
| FY2002 | \$ | 474,339,000                            | 2,435                                     | 22.24  | \$ | 74,127,000                             | 169                                  | 400,212,000             | 2,266                 | 20.16                |
| FY2003 | \$ | 513,812,000                            | 2,509                                     | 23.38  | \$ | 66,181,000                             | 154                                  | 447,631,000             | 2,355                 | 21.70                |
| FY2004 | \$ | 510,216,000                            | 2,538                                     | 22.95  | \$ | 74,846,000                             | 169                                  | 435,370,000             | 2,369                 | 20.98                |
| FY2005 | \$ | 537,453,000                            | 2,502                                     | 24.52  | \$ | 76,319,000                             | 163                                  | 461,134,000             | 2,339                 | 22.51                |
| FY2006 | \$ | 542,114,000                            | 2,518                                     | 24.58  | \$ | 85,369,000                             | 170                                  | 456,745,000             | 2,348                 | 22.21                |

## June 2001 Rate Case

|        |    | <b>Surplus<br/>Energy<br/>Revenues</b> | <b>Surplus<br/>Energy<br/>Sales (aMW)</b> | <b>Avg. Annual<br/>BPA Weighted<br/>Surplus Prices</b> |    | <b>Power<br/>Purchase<br/>Expenses</b> | <b>Power<br/>Purchases<br/>(aMW)</b> | <b>Net<br/>Revenues</b> | <b>Net<br/>Energy</b> | <b>Net<br/>Price</b> |
|--------|----|--|---|--|----|--|--------------------------------------|-------------------------|-----------------------|----------------------|
| FY2002 | \$ | 943,103,000                            | 1,875                                     | 57.42  | \$ | 223,359,000                            | 123                                  | 719,744,000             | 1,752                 | 46.90                |
| FY2003 | \$ | 506,176,000                            | 1,836                                     | 31.47  | \$ | 103,835,000                            | 130                                  | 402,341,000             | 1,706                 | 26.92                |
| FY2004 | \$ | 563,470,000                            | 1,880                                     | 34.21  | \$ | 79,921,000                             | 136                                  | 483,549,000             | 1,744                 | 31.65                |
| FY2005 | \$ | 597,640,000                            | 1,776                                     | 38.41  | \$ | 74,531,000                             | 121                                  | 523,109,000             | 1,655                 | 36.08                |
| FY2006 | \$ | 602,379,000                            | 1,856                                     | 37.05  | \$ | 70,008,000                             | 113                                  | 532,371,000             | 1,743                 | 34.87                |

## Current Assumptions

|        |    | <b>Surplus<br/>Energy<br/>Revenues</b> | <b>Surplus<br/>Energy<br/>Sales (aMW)</b> | <b>Avg. Annual<br/>BPA Weighted<br/>Surplus Prices</b> |    | <b>Power<br/>Purchase<br/>Expenses</b> | <b>Power<br/>Purchases<br/>(aMW)</b> | <b>Net<br/>Revenues</b> | <b>Net<br/>Energy</b> | <b>Net<br/>Price</b> |
|--------|----|--|---|--|----|--|--------------------------------------|-------------------------|-----------------------|----------------------|
| FY2002 | \$ | 667,202,000                            | 2,990                                     | 25.47  | \$ | 245,747,000                            | 666                                  | 421,455,000             | 2,324                 | 20.70                |
| FY2003 | \$ | 567,012,000                            | 1,839                                     | 35.20  | \$ | 152,217,000                            | 494                                  | 414,795,000             | 1,345                 | 35.21                |
| FY2004 | \$ | 541,142,000                            | 2,440                                     | 25.32  | \$ | 10,572,000                             | 29                                   | 530,570,000             | 2,411                 | 25.12                |
| FY2005 | \$ | 558,858,000                            | 2,589                                     | 24.64  | \$ | 6,278,000                              | 18                                   | 552,580,000             | 2,571                 | 24.54                |
| FY2006 | \$ | 533,981,000                            | 2,522                                     | 24.17  | \$ | 12,443,000                             | 35                                   | 521,538,000             | 2,487                 | 23.94                |

## Current Assumptions Minus May

|        |    | <b>Surplus<br/>Energy<br/>Revenues</b> | <b>Surplus<br/>Energy<br/>Sales (aMW)</b> | <b>Avg. Annual<br/>BPA Weighted<br/>Surplus Prices</b> |    | <b>Power<br/>Purchase<br/>Expenses</b> | <b>Power<br/>Purchases<br/>(aMW)</b> | <b>Net<br/>Revenues</b> | <b>Net<br/>Energy</b> | <b>Net<br/>Price</b> |
|--------|----|--|---|--|----|--|--------------------------------------|-------------------------|-----------------------|----------------------|
| FY2002 | \$ | 192,863,000                            | 555                                       | 3.24   | \$ | 171,620,000                            | 497                                  | 21,243,000              | 58                    | 0.54                 |
| FY2003 | \$ | 53,200,000                             | (670)                                     | 11.82  | \$ | 86,036,000                             | 340                                  | (32,836,000)            | (1,010)               | 13.51                |
| FY2004 | \$ | 30,926,000                             | (98)                                      | 2.37   | \$ | (64,274,000)                           | (140)                                | 95,200,000              | 42                    | 4.14                 |
| FY2005 | \$ | 21,405,000                             | 87  | 0.12   | \$ | (70,041,000)                           | (145)                                | 91,446,000              | 232                   | 2.03                 |
| FY2006 | \$ | (8,133,000)                            | 4   | (0.41)   | \$ | (72,926,000)                           | (135)                                | 64,793,000              | 139                   | 1.73                 |

## Current Assumptions Minus June

|        |    | <b>Surplus<br/>Energy<br/>Revenues</b> | <b>Surplus<br/>Energy<br/>Sales (aMW)</b> | <b>Avg. Annual<br/>BPA Weighted<br/>Surplus Prices</b> |    | <b>Power<br/>Purchase<br/>Expenses</b> | <b>Power<br/>Purchases<br/>(aMW)</b> | <b>Net<br/>Revenues</b> | <b>Net<br/>Energy</b> | <b>Net<br/>Price</b> |
|--------|----|--|---|--|----|--|--------------------------------------|-------------------------|-----------------------|----------------------|
| FY2002 | \$ | (275,901,000)                          | 1,115                                     | (31.95)  | \$ | 22,388,000                             | 543                                  | (298,289,000)           | 572                   | (26.19)              |
| FY2003 | \$ | 60,836,000                             | 3   | 3.73   | \$ | 48,382,000                             | 364                                  | 12,454,000              | (361)                 | 8.28                 |
| FY2004 | \$ | (22,328,000)                           | 560                                       | (8.90)   | \$ | (69,349,000)                           | (107)                                | 47,021,000              | 667                   | (6.53)               |
| FY2005 | \$ | (38,782,000)                           | 813                                       | (13.77)  | \$ | (68,253,000)                           | (103)                                | 29,471,000              | 916                   | (11.55)              |
| FY2006 | \$ | (68,398,000)                           | 666                                       | (12.88)  | \$ | (57,565,000)                           | (78)                                 | (10,833,000)            | 744                   | (10.93)              |

# Net Surplus - Historical and Forecasted

